Rec'd PCT/PTO 22 JAN 2002

FORM PTO-1390 (Modified) (REV 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)
BRU6144P0050US	10/031831

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP00/07484	**02 August 2000**	**05 August 1999**

TITLE OF INVENTION
MULTIPOLAR CIRCUIT-PROTECTION ASSEMBLY FOR A COLLECTOR RAIL SYSTEM

APPLICANT(S) FOR DO/EO/US
Klaus Bruchmann

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include itens (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☐ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).– unexecuted
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409). (in German)
12. ☒ A copy of the International Search Report (PCT/ISA/210). (page 1 of 2 only, in German)

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☐ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

    (a) WO 01/11642 (PCT/EP00/07484)
    (b) Return Postcard

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
10/031831	PCT/EP00/07484	BRU6144P0050US

24. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

		CALCULATIONS PTO USE ONLY
☐	Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**	
☒	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**	
☐	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**	
☐	International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**	
☐	International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**	

ENTER APPROPRIATE BASIC FEE AMOUNT =	**$890.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	**$0.00**	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	14 - 20 =	0	x $18.00	**$0.00**	
Independent claims	1 - 3 =	0	x $84.00	**$0.00**	
Multiple Dependent Claims **(check if applicable).**			☐	**$0.00**	

TOTAL OF ABOVE CALCULATIONS =	**$890.00**	
☒ Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.	**$445.00**	
SUBTOTAL =	**$445.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +	**$0.00**	
TOTAL NATIONAL FEE =	**$445.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).** ☐	**$0.00**	
TOTAL FEES ENCLOSED =	**$445.00**	
	Amount to be: refunded	$
	charged	$

a. ☒ A check in the amount of **$445.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **04-1644** A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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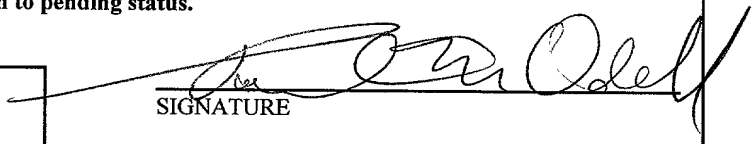

SIGNATURE

Paul M. Odell
NAME

28,332
REGISTRATION NUMBER

January 22, 2002
DATE

Rec'd PCT/PTO 15 MAY 2002
10/031831

"EXPRESS MAIL" Mailing Label No. EV108874824US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Klaus Bruchmann	PATENT APPLICATION
	Attorney Docket: BRU6144P0050US
Serial No.: 10/031,831	
International Filing Date: August 2, 2000	Group Art Unit: Not Yet Designated
For: MULTIPOLAR CIRCUIT-PROTECTION ASSEMBLY FOR A COLLECTOR RAIL SYSTEM (As Amended By The Enclosed Preliminary Amendment)	Confirmation No. 5767
Examiner: Not Yet Designated	

PRELIMINARY AMENDMENT

Box PCT
Commissioner For Patents
Washington, D.C. 20231

Sir:

Please enter this Preliminary Amendment before examining the application and calculating the filing fee.

The Preliminary Amendment refers to the English language translation enclosed herewith.

IN THE SPECIFICATION:

On page 1, in lines 1-4, please delete the title and heading, and insert the following new title, new paragraph, and new heading:

--MULTIPOLAR CIRCUIT-PROTECTION ASSEMBLY

FOR A COLLECTOR RAIL SYSTEM

This application is an application filed under 35 U.S.C. Sec. 371 as a national stage of international application PCT/EP00/07484, which was filed August 2 ,2000.

TECHNICAL FIELD--.

On page 1, please amend the paragraph beginning at line 6 as follows:

--The invention relates to a multipole fused switch arrangement for busbar systems having at least two fused switch units which each holds a fuse link , with the fused switch units having a mounting and contact apparatus for a busbar, and having a switching apparatus for closing and interrupting the circuit of all the switched fuse units.--

On page 1, after line 12, please insert the following new heading:

--BACKGROUND OF THE INVENTION--.

On page 1, after line 22, please insert the following new heading:

--SUMMARY OF THE INVENTION--.

On page 1, please amend the two consecutive paragraphs beginning at line 24 as follows:

--Accordingly, one object of the invention is to provide a multipole fused switch arrangement which is simple to operate and which minimizes the risk of incorrect operations by untrained personnel.--

--The object is achieved by a multipole fused switch arrangement according to the invention.--

On page 5, after line 17, please insert the following new heading:

--BRIEF DESCRIPTION OF THE DRAWINGS--.

On page 6, after line 3, please insert the following new heading:

--DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT--.

On page 12, in line 1, please delete the heading "Claims" and insert the following new heading:

--WHAT IS CLAIMED IS:--.

IN THE CLAIMS:

Please amend claim 4 as follows:

4. (Amended) The fused switch arrangement as claimed in claim 1, wherein the operating arrangement (60) is coupled to the switching lever (40) via a switching rod (50).

Please amend claim 5 as follows:

5. (Amended) The fused switch arrangement as claimed in claim 1, wherein the coupling between the operating arrangement (60) and the switching lever (50) is on one side, and only switching of the switching lever (40) from the switched-on position to the switched-off position results in force being exerted on the operating arrangement (60) in the direction of the interrupted position.

Please amend claim 6 as follows:

6. (Amended) The fused switch arrangement as claimed in claim 4, wherein the switching rod (50) is guided in a recess (41) in the switching lever (40).

Please amend claim 8 as follows:

8. (Amended) The fused switch arrangement as claimed in claim 1, wherein the operating arrangement (60) is prestressed by at least one spring apparatus (62) in its contact position.

Please amend claim 9 as follows:

9. (Amended) The fused switch arrangement as claimed in claim 1, wherein each blocking apparatus (70) is prestressed by a spring apparatus (71) in a position which blocks the operating arrangement (60) in its interrupted position.

Please amend claim 11 as follows:

11. (Amended) The fused switched arrangement as claimed in claim 1, wherein, in its blocking position, the blocking apparatus (70) engages in an opening (63) in the operating arrangement (60).

Please amend claim 12 as follows:

12. (Amended) The fused switch arrangement as claimed in claim 1, wherein the locking apparatus (80) locks the fuse link (20) directly.

Please amend claim 13 as follows:

13. (Amended) The fused switch arrangement as claimed in claim 1, wherein the locking apparatus (80) locks the fuse link (20) indirectly via a fuse plug (25), in which the fuse link (20) is inserted.

REMARKS

The amendments to the application have been made to remove multiple dependencies from some of the claims, to set forth headings in the specification, and to conform with U.S. practice. The "translated" English language title has been amended to the English language title as set forth by WIPO in the PCT Publication WO 01/11642 A1 so as to minimize confusion.

Applicant believes that these amendments are fully supported by the international application and do not believe that these amendments constitute new matter.

Applicant herewith submits a copy of the English translation of the original international application along with this Preliminary Amendment.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached marked-up version is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Entry of the amendments is respectfully requested.

Respectfully submitted,

WOOD, PHILLIPS, KATZ, CLARK & MORTIMER

By _____
Paul M. Odell, Reg. No. 28,332

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Chicago, Illinois 60661-2511
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May 15, 2001

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

On page 1, in lines 1-4, the title and heading has been canceled and replaced with the following new title, new paragraph, and new heading as follows:

[MULTIPOLE FUSED SWITCH ARRANGEMENT

FOR BUSBAR SYSTEMS

Description]

MULTIPOLAR CIRCUIT-PROTECTION ASSEMBLY

FOR A COLLECTOR RAIL SYSTEM

This application is an application filed under 35 U.S.C. Sec. 371 as a national stage of international application PCT/EP00/07484, which was filed August 2, 2000.

TECHNICAL FIELD.

On page 1, the paragraph beginning at line 6 has been amended as follows:

The invention relates to [A] a multipole fused switch arrangement for busbar systems having at least two fused switch units which each holds a fuse link , with the fused switch units having a mounting and contact apparatus for a busbar, and having a switching apparatus for closing and interrupting the circuit of all the switched fuse units.

On page 1, after line 12, the following new heading has been added:

BACKGROUND OF THE INVENTION.

On page 1, after line 22, the following new heading has been added:

SUMMARY OF THE INVENTION.

On page 1, the two consecutive paragraphs beginning at line 24 have been amended as follows:

Accordingly, one object of the invention is to provide a multipole fused switch arrangement [as claimed in the preamble of claim 1,] which is simple to operate and which minimizes the risk of incorrect operations by untrained personnel.

The object is achieved by a multipole fused switch arrangement [as claimed in claim 1, while claims 2 to 14 relate to particularly preferred embodiments of the fused switch arrangement] according to the invention.

On page 5, after line 17, the following new heading has been added:

BRIEF DESCRIPTION OF THE DRAWINGS.

On page 6, after line 3, the following new heading has been added:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT.

On page 12, in line 1, the heading has been changed as follows:

[Claims] WHAT IS CLAIMED IS:.

IN THE CLAIMS:

Claim 4 has been amended as follows:

4. (Amended) The fused switch arrangement as claimed in claim 1 [one of the preceding claims], wherein the operating arrangement (60) is coupled to the switching lever (40) via a switching rod (50).

Claim 5 has been amended as follows:

5. (Amended) The fused switch arrangement as claimed in claim 1 [one of the preceding claims], wherein the coupling between the operating arrangement (60) and the switching lever (50) is on one side, and only switching of the switching lever (40) from the switched-on position to the switched-off position results in force being exerted on the operating arrangement (60) in the direction of the interrupted position.

Claim 6 has been amended as follows:

6. (Amended) The fused switch arrangement as claimed in claim 4 [or 5], wherein the switching rod (50) is guided in a recess (41) in the switching lever (40).

Claim 8 has been amended as follows:

8. (Amended) The fused switch arrangement as claimed in claim 1 [one of the preceding claims], wherein the operating arrangement (60) is prestressed by at least one spring apparatus (62) in its contact position.

Claim 9 has been amended as follows:

9. (Amended) The fused switch arrangement as claimed in claim 1 [one of the preceding claims], wherein each blocking apparatus (70) is prestressed by a spring apparatus (71) in a position which blocks the operating arrangement (60) in its interrupted position.

Claim 11 has been amended as follows:

11. (Amended) The fused switched arrangement as claimed in claim 1 [one of the preceding claims], wherein, in its blocking position, the blocking apparatus (70) engages in an opening (63) in the operating arrangement (60).

Claim 12 has been amended as follows:

12. (Amended) The fused switch arrangement as claimed in claim 1 [one of the preceding claims], wherein the locking apparatus (80) locks the fuse link (20) directly.

Claim 13 has been amended as follows:

13. (Amended) The fused switch arrangement as claimed in claim 1 [one of claims 1 to 11], wherein the locking apparatus (80) locks the fuse link (20) indirectly via a fuse plug (25), in which the fuse link (20) is inserted.

Rec'd PCT/PTO 15 MAY 2002
10/031831

MULTIPOLE FUSED SWITCH ARRANGEMENT FOR BUSBAR SYSTEMS

Description

The invention relates to A multipole fused switch arrangement for busbar systems having at least two fused switch units which each holds a fuse link , with the fused switch units having a mounting and contact apparatus for a busbar, and having a switching apparatus for closing and interrupting the circuit of all the switched fuse units.

Such fused switch arrangements are used in particular for protecting three-phase circuits, in which case three-pole fused switch arrangements are required.

Since such fused switch arrangements are also operated by those not skilled in the art, it has frequently been found to be a problem that incorrect operations even on the fused switch arrangement have led to damage to the appliances.

Accordingly, one object of the invention is to provide a multipole fused switch arrangement as claimed in the preamble of claim 1, which is simple to operate and which minimizes the risk of incorrect operations by untrained personnel.

The object is achieved by a multipole fused switch arrangement as claimed in claim 1, while claims 2 to 14 relate to particularly preferred embodiments of the fused switch arrangement according to the invention.

According to the invention, the fused switch arrangement comprises a combined switching and blocking apparatus.

The combined switching and blocking apparatus has a switching lever, which can be switched to and fro between a switched-on position and a switched-off position, an operating arrangement for switching switching links of the fused switch units, in which case the operating apparatus can be switched to and fro between a contact position and an interrupted position, a blocking apparatus for each fused switch unit for blocking the operating arrangement in the interrupted position, and a locking apparatus for locking the fuse link in an operating position, in which case the locking apparatus can be switched to and fro between a locked position and an isolating position.

The locking apparatus is coupled to the switching lever such that it is always in the locked position when the switching lever is in the switched-on position, and which, conversely, is in the isolating position when the switching lever is in the switched-off position. The operating arrangement is furthermore coupled to the switching lever such that it is always in the interrupted position when the switching lever is in its switched-off position. Further coupling between the operating arrangement and switching lever is possible, but not necessary.

The blocking apparatus blocks the operating arrangement in the interrupted position when one of the fuse links from the fused switch arrangement is not in its operating position, that is to say it has been completely removed from the fused switch arrangement, or has been at least partially withdrawn from its operating position.

The multipole fused switch arrangement according to the invention carries out two major protection functions. Firstly, it prevents the circuit of the fused switch

arrangement from being closed via the switching links when the fuse links are not all in their operating position, and the fused switch arrangement is thus no longer in a ready to operate state. Secondly, it makes it impossible to remove fuse links when the fused switch arrangement is switched on, or to move them from their operating position, without previously having interrupted the circuit, so that the fuse links can be replaced only when no current is flowing and no voltage is applied. This double protection function reliably precludes incorrect operations and prevents damage to the elements of the fused switch arrangement, in particular of the contacts, for example as a result of switching arcs and spark flashovers.

In one preferred embodiment, the operating arrangement has a pushrod for each fused switch unit, with the pushrods being rigidly connected to one another and each pushrod resting on spring-loaded switching links via which the circuit of the fused switch unit is closed and interrupted. This ensures that all the circuits in all the fused switch units are interrupted even if only one of the pushrods is blocked in its interrupted position, since the associated fuse link is not in its operating position.

The operating arrangement can be coupled directly or indirectly to the switching lever in various ways. The coupling is preferably provided via a switching rod which is guided in a recess in the switching lever. The operating arrangement and the switching lever are coupled on only one side, that is to say only switching of the switching lever from the switched-on position to the switched-off position results in force being exerted on the operating arrangement via the switching rod, while there is no direct coupling between the switching rod and

the operating arrangement when the switching lever is switched from the switched-off position to the switched-on position. Thus, although the switching lever can also be moved to the switched-on position when the operating arrangement is blocked in its interrupted position, no force is exerted, however, by the switching rod or the switching lever on the operating arrangement. This prevents loading or damage, in particular to the blocking apparatus. At the same time, this ensures that the circuit cannot be closed inadvertently by forceful operation of the switching lever while at the same time destroying the blocking apparatus.

The operating arrangement is preferably prestressed in its contact position by at least one spring apparatus, so that the operating arrangements are automatically located in their contact position when, firstly, all the fuse links are in their operating position and the blocking apparatus is in consequence not acting on the operating arrangement, and when the operating lever is in its switched-on position.

Each blocking apparatus is advantageously prestressed by a spring apparatus in a position which blocks the operating arrangement in its interrupted position, so that the operating arrangement is released only when one fuse link is in its operating position, as a result of which the blocking apparatus is moved against the force of the spring effect to a position in which the blocking apparatus and the operating arrangement do not influence one another. The blocking apparatus is automatically moved by the spring apparatus to its blocking position as soon as one fuse link is removed from its operating position, although, owing to the locking apparatus, this can occur only if the switching lever is in its switched-off position, and the operating arrangement is

thus in its interrupted position.

When it is in its blocking position, the blocking apparatus advantageously engages in an opening in the operating arrangement, so that the blocking apparatus prevents any movement of the operating arrangement.

Depending on the configuration of the individual fused switch units, the fuse links are inserted directly into the fused switch unit, or fuse plugs are used to hold the fuse links in the fused switch units.

Accordingly, a locking apparatus can be provided which acts directly on the fuse link, but locking apparatuses are preferably provided which do not act directly on the fuse link, but which engage with a latching element on a fuse plug when in their locked position.

The features and advantages of the invention will become particularly clear from the attached schematic drawings, in which:

Figure 1 shows a cross-sectional view of one embodiment of a three-pole fused switch arrangement, with the switching lever being in a switched-on position and the fused switch arrangement being ready to operate;

Figure 2 shows a detail of the fused switch arrangement shown in Figure 1, with the switching lever being in a switched-off position;

Figure 3 shows the detail shown in Figure 2, but with the fuse link having been removed; and

Figure 4 shows the details shown in Figures 2 and 3, but

with the switching lever having been removed to the switched-on position after removal of the fuse link.

Figure 1 shows a fused switch arrangement having three fused switch units 10, into each of which a fuse plug 25 with a fuse link 20 is inserted.

Each fused switch unit 10 is mounted on a busbar 90 by means of a surrounding spring 95.

The switching and blocking apparatus according to the invention comprises, in the embodiment shown in Figure 1, a switching lever 40, a spring-loaded switching rod 50, an operating apparatus 60 which in each case comprises one pushrod 61 per fused switch unit 10, a spring-loaded blocking apparatus 70, and a likewise spring-loaded locking apparatus 80. The spring 52 of the switching rod 50 has a considerably greater spring constant than the springs 62 in the operating apparatus and the springs 81 in the locking apparatus, which have approximately the same spring constants. The springs 71 in the blocking apparatus 70 have the lowest spring constant in the switching and blocking apparatus.

When the fused switch arrangement is in the working position shown in Figure 1, the switching lever 40 is in the switched-on position. The switching lever 40 has a recess 41, in which one end of the switching rod 50 is guided. The other end of the switching rod 50 is seated in a bearing 51 in the fused switch arrangement.

The operating arrangement 60 is prestressed in its contact position indirectly via three springs 62, which are positioned between the housing of the fused switch arrangement and switching links 12. The switching

links 12 thus bridge an interruption in a bottom contact 30, which makes contact with a lower contact 21 of the fuse link 20, so that the contact is produced between the fuse link 20 and the busbar 90.

The operating arrangement 60 is in this case deflected so far in the direction of the switching rod 50 that the pushrod 61 on the left in the drawing rests on the switching rod 50.

Each upper contact 22 of the fuse link 20 makes contact with a tapping contact 14, so that the circuit is closed via the tapping contact 14, the upper contact 22 and the lower contact 21 of the fuse link 20, the bottom contact 13, the switching link 12, the extension of the interrupted bottom contact 13 and the busbar 19.

The fuse link 20 is always pressed by force from a spring 26 in the fuse plug 25 against the bottom contact 13, thus ensuring a reliable contact.

The locking apparatus is pressed by the formed-out region 43 of the switching lever 40 into an opening (which is used as a latching element 27) in the fuse plug 25, so that the fuse plug 25 is fixed, together with the fuse link 20, in its operating position. The locking apparatus 80 is formed as one part for all the fused switch units and is prestressed by means of a spring apparatus 81 against the formed-out region 43 of the switching lever 40.

Individual fused switch units and their assemblies are identical, and it should once again be mentioned that both the locking apparatus 80 and the operating arrangement 60 are formed as one part for all the fused switch units, so that the individual elements can thus

move only together, and no relative movement is possible, for example between the pushrods 61. In contrast, the blocking apparatuses 70 are autonomous assemblies, which are separate from one another, in each fused switch unit 10.

The method of operation of the switching and blocking apparatus 30 according to the invention is clear from the further figures 2 to 4, which, for simplicity, show only a detail of the embodiments.

In Figure 2, the switching lever 40 has been moved from its switched-on position to its switched-off position. The locking apparatus 80, which is prestressed against the switching lever 40 by means of the spring 81, has been moved to the left in the figure, after passing over a step 44 (which is introduced in the switching lever 40) in the switching lever 40, so that the interlocking element 82 no longer engages with the opening 27 in the fuse plug 25. The fuse plug 25, together with the fuse link 20, is thus no longer locked in its operating position.

The switching of the switching lever 40 to its switched-off position results in the switching rod 50 pivoting to the right in its bearing 51 and in the recess 42, as a result of which the operating arrangement 60 is forced via the pushrod 61 to its interrupted position, in which the switching link 12 is lifted off the bottom contact 13. The circuit is thus interrupted at the bottom contact 13.

Since the fuse plug 25 is still in its operating position and presses against a protrusion on the blocking apparatus, the blocking apparatus 70 is still held in a non-blocking position against the influence of its spring

apparatus 71.

Subject to the precondition that all the other fused switch units (which are not shown in Figure 2), are in analogous positions, the switching lever 40 can be moved back to its switched-on position, as a result of which the fuse plugs 25 are automatically locked by the locking apparatus 80. Since the operating arrangement 60 is not blocked, it is pushed to the left in the drawing together with the switching link 12 by means of the spring apparatus 62, as a result of which the switching link 12 makes contact with the interrupted bottom contact 13, and closes the circuit.

Figure 3 shows the fused switch arrangement shown in Figure 2, but with the fuse plug 25 together with the fuse link 20 having been removed from the fused switch unit 10. In order to remove the fuse plug 25 from the fused switch unit, it must be pushed slightly to the left in the figure, in order that the latching element 16 of the fuse plug 25 can be moved over the projection 15 of the housing of the fused switch arrangement.

The locking apparatus 80 is, as already explained in conjunction with Figure 2, no longer engaged with the fuse plug 25, so that the locking apparatus 80 does not prevent removal of the fuse plug 25 and of the fuse link 20.

Once the fuse plug 25 is no longer pressing downwards onto the protrusion on the blocking element 70, the blocking apparatus 70 is moved upwards in the drawing by means of its spring 71, so that parts of the blocking apparatus 70 extend into an opening 63 in the pushrod 61 of the operating arrangement 60, blocking it.

As is shown in Figure 4, although the switching lever 40 can be moved to its switched-on position, this results, however, in the switching rod 50 also being pivoted to the switched-on position. The pushrod 61 and the mounting arrangement 60 do not follow the movement of the switching rod 50 since the blocking apparatus 70 is engaged in the opening 63 in the pushrod 61. Since the switching rod 50 and the pushrod 61 are not firmly connected to one another, movement of the switching lever does not exert any force on the pushrod 61 or on the blocking apparatus 70, either. The pushrod 61 and the blocking apparatus 60 are still blocked, so that the switching link 12 is also held at a distance from the bottom contact 13, against the spring force of the spring 62, by the pushrod 61. Thus, as designed, the circuit is still interrupted, as before.

Merely for the sake of completeness, it should be noted that the integral, rigid operating arrangement 60 means that the switching links 12 of the other fused switch units 10 are also held by the corresponding pushrods 61 at a distance from the associated bottom contact 13, even if the fuse plug 25 has not been removed from these fused switch units 10 and the corresponding pushrod 61 is in consequence not autonomously blocked by the separate blocking apparatus 70.

Since the switching rod 50 and the pushrod 61 are not firmly connected to one another this prevents careless operating personnel from being able to cause damage to the fused switch arrangement when the operating arrangement 60 is blocked by one of the blocking apparatuses 70.

Finally, it should be mentioned that, of course, modifications can be carried out to the specific

refinements of this embodiment without departing from the subject matter of the invention. In particular, fuse links without fuse plugs can be inserted directly into the fused switch units, and different types of fuse, for example screw-in fuses, may be used instead of plug-in fuses, or a different refinement of the switching lever or of the recess with the dead point may be chosen for switching which is essentially independent of manual switching.

Furthermore, it should be mentioned that the drawings are only schematic and, in particular, no restrictions with regard to dimensions and sizes can be derived from the drawings.

Claims

1. A multipole fused switch arrangement for busbar systems having at least two fused switch units (10) which each holds a fuse link (20), with the fused switch units (10) having a mounting and contact apparatus (11) for a busbar (90), and having a switching apparatus for closing and interrupting the circuit of all the switched fuse units (10),
wherein
the fused switch arrangement comprises a combined switching and blocking apparatus (30), having
- a switching lever (40) which can be switched to and fro between a switched-on position and a switched-off position,
- an operating arrangement (60) for switching switching links (12) in the fused switch unit (10), in which case the operating arrangement (60) can switch to and fro between a contact position and an interrupted position,
- in each case one blocking apparatus (70) for each fused switch unit (10) for blocking the operating arrangement (60) in the interrupted position, and
- a locking apparatus (80) for locking the fuse links (20) in an operating position, in which case the locking apparatus (80) can be switched to and fro between a locked position and an isolating position,

with the locking apparatus (80) being coupled to the switching lever (40) such that it is in the locked position when the switching lever (40) is in the switched-on position, and is in the isolating position when the switching lever (40) is in the switched-off position, with the operating

arrangement (60) being coupled to the switching lever (40) such that it is in the interrupted position when the switching lever (40) is in the switched-off position, and

with a blocking apparatus (70) blocking the operating arrangement (60) in the interrupted position when one of the fuse links (20) of the associated fused switch arrangement is not in its operating position.

2. The fused switch arrangement as claimed in claim 1, wherein the operating arrangement (60) has a pushrod (61) for each fused switch unit (10), with the pushrods (61) being rigidly connected to one another.

3. The fused switch arrangement as claimed in claim 2, wherein each pushrod (61) rests on the spring-loaded switching links (12).

4. The fused switch arrangement as claimed in one of the preceding claims, wherein the operating arrangement (60) is coupled to the switching lever (40) via a switching rod (50).

5. The fused switch arrangement as claimed in one of the preceding claims, wherein the coupling between the operating arrangement (60) and the switching lever (50) is on one side, and only switching of the switching lever (40) from the switched-on position to the switched-off position results in force being exerted on the operating arrangement (60) in the direction of the interrupted position.

6. The fused switch arrangement as claimed in claim 4 or 5, wherein the switching rod (50) is guided in a recess (41) in the switching lever (40).

7. The fused switch arrangement as claimed in claim 6, wherein the recess (41) has a dead point (42) for switching which is essentially independent of manual switching.

8. The fused switch arrangement as claimed in one of the preceding claims, wherein the operating arrangement (60) is prestressed by at least one spring apparatus (62) in its contact position.

9. The fused switch arrangement as claimed in one of the preceding claims, wherein each blocking apparatus (70) is prestressed by a spring apparatus (71) in a position which blocks the operating arrangement (60) in its interrupted position.

10. The fused switch arrangement as claimed in claim 9, wherein each blocking apparatus (70) is arranged such that the movement of the associated fuse link (20) to its operating position forces said blocking apparatus (70) against the spring force of the spring apparatus (71) to a position which releases the operating apparatus (60).

11. The fused switched arrangement as claimed in one of the preceding claims, wherein, in its blocking position, the blocking apparatus (70) engages in an opening (63) in the operating arrangement (60).

12. The fused switch arrangement as claimed in one of

the preceding claims, wherein the locking apparatus (80) locks the fuse link (20) directly.

13. The fused switch arrangement as claimed in one of claims 1 to 11, wherein the locking apparatus (80) locks the fuse link (20) indirectly via a fuse plug (25), in which the fuse link (20) is inserted.

14. The fused switch arrangement as claimed in claim 13, wherein the locking apparatus (80) has an interlocking element (82) which, in the interlocked position, engages in an interlocking manner in a latching element (27) on the fuse plug (25).

Abstract

The invention relates to a multipole fused switch arrangement for busbar systems having at least two fused switch units (10) which each holds a fuse link (20), with the fused switch units (10) having a mounting and contact apparatus (11) for a busbar, and having a switching apparatus for closing and interrupting the circuit of all the switched fuse units, with the fused switch arrangement comprising a combined switching and blocking apparatus (30), having a switching lever (40), an operating arrangement (60), a blocking apparatus (70) for each fused switch unit (10), and a locking apparatus (80).

DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)	Attorney Docket No.: BRU6144P0050US
	First Named Inventor: Klaus Bruchmann
	COMPLETE IF KNOWN
☒ Declaration Submitted With Initial Filing ☐ Declaration Submitted After Initial Filing (surcharge (37 CFR 1.16(a)) required	Application Number:
	Filing Date:
	Group Art Unit:
	Examiner Name:

As a below-named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed) or an original, first and joint inventor (if plural names are listed) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **MULTIPOLAR CIRCUIT-PROTECTION ASSEMBLY FOR A COLLECTOR RAIL SYSTEM**, the specification of which:

☐ is attached hereto; or

☒ was filed on August 2, 2000 as PCT International Application Serial No. PCT/EP00/07484 and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to patentability as defined in 37 CFR. 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Numbers	Country	Foreign Filing Date (MM/DD/YYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
199 37 017.6	Germany	08/05/99	☐	☐	☒
299 13 698.1	Germany	08/05/99	☐	☐	☒
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet attached hereto.

I hereby claim the benefit of any United States application(s) listed below.

Jan. 17, 2002 3:50PM ROCKEY MILNAMOW Kalz No. 9162 P. 6

Application Number(s)	Filing Date	☐ Additional application numbers are listed on a supplemental priority data sheet attached hereto.

The undersigned hereby authorizes the U.S. attorney(s) or agent(s) named herein to accept and follow instructions from the assignee, if any, of the undersigned or from as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney(s) or agent(s) and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney(s) or agent(s) named herein will be so notified by the undersigned.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Lawrence J. Chapa Reg. No. 39,135	Martin L. Katz Reg. No. 25,011	Keith V. Rockey Reg. No. 24,713
Randall T. EricksonReg. No. 33,872	Kathleen A. Lyons Reg. No. 31,852	Thomas I. Ross Reg. No. 29,275
Stephen D. Geimer Reg. No. 28,846	John P. Milnamow Reg. No. 20,635	Joel E. Siegel Reg. No. 25,440
H. Vincent Harsha Reg. No. 18,045	Paul M. Odell Reg. No. 28,332	
Allen J. Hoover Reg. No. 24,103		

whose mailing address for this application is: ROCKEY, MILNAMOW & KATZ, LTD.
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Telephone: (312) 616-5400
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I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:	~~Klaus Bruchmann~~
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Residence:	Am Oelberg 7a, D-96450 Coburg, Germany SEX
Post Office Address *(if different)*:	same as residence
Signature:	Date: 15. März 2002
☐ A petition has been filed for this unsigned inventor.	

DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)		Attorney Docket No.: BRU6144P0030US
		First Named Inventor: Klaus Bruchmann
		COMPLETE IF KNOWN
☒ Declaration Submitted With Initial Filing	☐ Declaration Submitted After Initial Filing (surcharge (37 CFR 1.16(a)) required	Application Number:
		Filing Date:
		Group Art Unit:
		Examiner Name:

As a below-named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed) or an original, first and joint inventor (if plural names are listed) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **FUSE COMBINATION UNIT WITH MAINTAINED LOCKING**, the specification of which:

☐ is attached hereto; or

☒ was filed on July 20, 2000 as PCT International Application Serial No. PCT/EP00/06945 and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to patentability as defined in 37 CFR. 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Numbers	Country	Foreign Filing Date (MM/DD/YYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
199 34 542.2	Germany	07/22/99	☐	☐	☒
299 12 853.2	Germany	07/22/99	☐	☐	☒
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet attached hereto.

I hereby claim the benefit of any United States application(s) listed below.

Appl.	Filing Date	☐ Additional application numbers are listed on a supplemental priority data sheet attached hereto.

The undersigned hereby authorizes the U.S. attorney(s) or agent(s) named herein to accept and follow instructions from the assignee, if any, of the undersigned or from as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney(s) or agent(s) and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney(s) or agent(s) named herein will be so notified by the undersigned.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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Stephen D. Geimer	Reg. No. 28,846	John P. Milnamow	Reg. No. 20,635	Joel E. Siegel	Reg. No. 25,440
H. Vincent Harsha	Reg. No. 18,045	Paul M. Odell	Reg. No. 28,332		
Allen J. Hoover	Reg. No. 24,103				

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I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:	Klaus Bruchmann	
Citizenship:	German	
Residence:	Am Oelberg 7a, D-96450 Coburg, Germany	
Post Office Address *(if different)*:	same as residence	
Signature: X		Date: 15. März 2002
☐ A petition has been filed for this unsigned inventor.		

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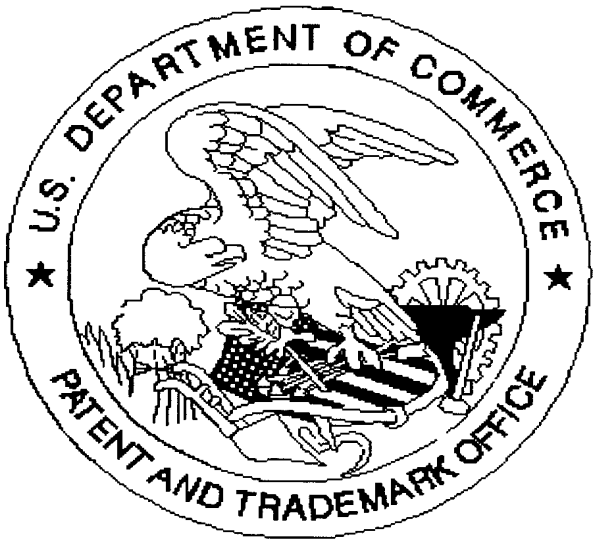

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